

## **Remarks/Arguments**

### **Information Disclosure Statement**

The applicant notes the examiner's objection to the applicant's failure to provide a date of publication for the document titled "Synthesis of nanostructured sorbent materials using supercritical fluids" in the previously filed Information Disclosure Statement. Upon further review, the applicant notes that this publication was published in the "Abstracts of Papers, 223<sup>rd</sup> ACS National Meeting, Orlando, FL, United States, April 7-11, 2002" by the American Chemical Society. Accordingly, publication of the reference occurred several months after the filing date of the instant application, and is therefore not prior art nor is it relevant to the examination of the application. Accordingly, the applicant is not resubmitting the reference, and is content for it to remain in the file with the information contained therein not having been considered by the examiner on the merits.

### **Specification**

In the specification, the applicant has amended the paragraph to update the status of US Patent Application Ser. No. 10/045,930, and entitled "HYDROETCHING OF HIGH SURFACE AREA CERAMICS USING MOIST SUPERCRITICAL FLUIDS", filed October 26, 2001. No new matter is added by this amendment.

### **35 U.S.C § 102(b)**

The examiner has rejected claims 1-5, 7-9 and 11-20 under 35 U.S.C § 102(b) as being anticipated by "Battelle Memorial Institute, WO 0/56450" (sic). The examiner argues that "the structure of both ceramic oxide aerogels and metoporous silica are the porous silicates and have not been shown to be distinct" (sic). This argument is nothing more than a re-hash of the September 11, 2003 objection made by the prior examiner, Richard D. Loverling, albeit using a different reference. However, none of the references

teach or suggest “aerogels” and, as such, cannot possibly form the basis of a proper rejection under 35 USC 102(b).

The examiner makes the unsupported assertion that “ceramic oxide aerogels” and “mesoporous silica” “have not been shown to be distinct.” But it isn’t the applicant’s burden to show they are distinct. Instead, it is the examiner’s burden to show that they are not. This is a burden the examiner cannot possibly meet. While mesoporous materials and aerogels may use some of the same starting materials in their fabrication, they are not fabricated in the same way, nor do they result in the same structures. Mesoporous materials are porous materials with regularly arranged, uniform mesopores (2 nm to 50 nm in diameter). As set forth by the applicant, aerogels highly disordered materials that are formed by an explosive or sol-gel evaporative process. As a result of these differences in structure, methods and techniques for coating mesoporous materials with other materials, such as self-assembled monolayers, will not work when applied to aerogels, and the resultant coated materials are not the same. It should be apparent that this is the case, as the entire background section of the instant application is directed towards describing the problems of using fabrication techniques that work with other materials, such as mesoporous materials, but which destroy aerogels.

The examiner next asserts that claims 1-5 and 7-9 are anticipated by Cabot Corp. WO 99/36355, hereafter Cabot. The examiner asserts that “the claimed characteristic of a monolayer would have been inherent to the Cabot Corp reference since all available surface groups would have reacted to form the hydrophobic silica.” However, the Cabot reference itself makes clear that this doesn’t happen. In table 1 on page 14, Cabot shows that a wide range of possible coatings can form on the surface of the fumed silica. Cabot notes on page 13 that “a lower c value is indicative of a greater number of hydrophobic groups on the silica.” While the applicant does not necessarily agree with Cabot’s interpretation of a C value in BET analysis, plainly, Cabot recognized that the brute force method Cabot was employing didn’t form a monolayer, or as the applicant has defined it, “an organized single layer of molecules.” Cabot forms a hydrophobic coating, but with a

wide variance in the percentage of silica material that is covered, and in no cases with the complete coverage associated with a monolayer. Accordingly, the Cabot reference itself refutes the examiner's assertion that the formation of a monolayer would have been "inherent." The applicant therefore respectfully requests that the examiner's rejection under 35 USC 102(b) be withdrawn for these claims.

The examiner next asserts that claims 1-5 and 7-9 are anticipated by US Patent 6,005,012 to Hrubesh et al, (hereinafter the "Hrubesh" reference). However, Hrubesh is readily distinguished from the present invention. In the first instance, Hrubesh is not depositing a monolayer as required by the present invention. As shown by Hrubesh in Figs. 2 and 3, there is no crosslinking of the alkyl groups deposited by Hrubesh, and there are defects in the bonding structure (note the unbonded OH groups shown in the Figure.) In contradistinction, the present invention forms monolayers which are defined as "an organized single layer of molecules, the formation of which is driven by the aggregation of the component monomers which have an affinity for both each other and the surface of the aerogel." As shown in Figures 2 and 3, the alkyl groups deposited by Hrubesh have no affinity for one and another. Indeed, quite the opposite. As shown by Hrubesh, the alkyl groups not only have no affinity for each other, they act to prevent bonding of similar alkyl groups to adjacent OH groups present on the aerogel. Plainly, this is because Hrubesh is not concerned with depositing a monolayer. Rather, Hrubesh is concerned with depositing a hydrophobic coating, which is not self-organizing. It is therefore plain that the Hrubesh reference is describing a method separate and distinct from the present invention that produces a product that is materially different from the product resulting from the present invention. The applicant therefore respectfully requests that the examiner's rejection under 35 USC 102(b) be withdrawn for these claims.

Finally, the examiner asserts that claims 1-4 and 7-8 are anticipated by US Patent 3,562,177 to Teicher et al, (hereinafter the "Teicher" reference). Again, the examiner asserts that "the claimed characteristic of a monolayer would have been inherent to the

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Teicher et al reference since all available surface groups would have reacted to form the hydrophobic silica.” As with Cabot, however, the Teicher reference itself makes plain that such is not the case. In the abstract, Teicher plainly states that there is “at least one silanol group per one square millimicron” and “preferably between 4 and 12 silanol groups per one square millimicron.” As such, it is apparent that the formation of monolayers cannot be “inherent” in the Teicher process, as even Teicher’s best case scenario fails to form silanol groups with the density expected in a monolayer. For a claim to be inherent in the prior art it “is not sufficient that a person following the disclosure *sometimes* obtain the result set forth in the [claim]; *it must invariably happen.*” (emphasis added). *Standard Oil Co. (Indiana) v. Montedison, S.p.A.*, 664 F.2d 356, 372, 212 USPQ 327, 341 (3d Cir. 1981), *cert. Denied*, 456 U.S. 915, 215 USPQ 95(1982). “To serve as an anticipation when the reference is silent about the asserted inherent characteristic, such gap in the reference may be filled with recourse to extrinsic evidence. Such evidence must make clear that the missing descriptive matter is *necessarily* present in the thing described in the reference and *that it would have been recognized by persons of ordinary skill.*” (emphasis added). *Continental Can Co. USA v. Monsanto Co.*, 948 F.2d 1264, 20 USPQ 2d 1746, 1749-50 (Fed. Cir. 1991). Plainly, neither the Cabot, Hrubesh or Teicher references can be said to teach directly the formation of monolayers. Further, the examiner’s assertion that such would be “inherent” is plainly refuted by the references themselves. Accordingly, the examiner cannot possibly hope to meet the requirements for a proper rejection under 35 USC 102(b). The applicant therefore respectfully requests that the examiner’s rejection under 35 USC 102(b) be withdrawn for these claims.

The examiner is undoubtedly concerned about the apparent breadth of claim 1, and has done an admirable job in bringing to bear references that relate to the claim. However, the Patent and Trademark Office has now filed three consecutive office non-final office actions, each citing new art. Twice before, the Patent and Trademark Office has ultimately accepted the applicant’s arguments and has withdrawn the objections. As with these prior references, none of the references in the latest office action teaches or

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suggests "an aerogel having a monolayer coating." Further, in this latest office action, the examiner has made no effort whatsoever to address the specific limitations of claims 2-5, 7-9 and 11-20, and instead has improperly rejected them without comment. Such is impermissible on its face. Finally, the Patent and Trademark Office has, on at least one occasion, lost the applicant's response to an office action.

The applicants appreciate the examiner's efforts in providing a comprehensive examination, however, enough is enough. The applicants respectfully request that the examiner remove his objection under 35 USC 102(b) and allow all outstanding claims to issue.

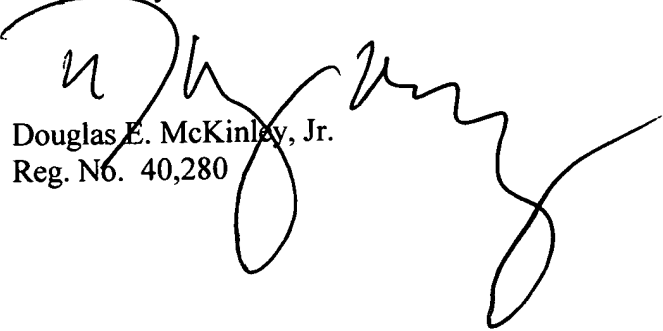
**Claims 6, 10, and 21-25**

The applicant notes the examiner's indication of claims 6, 10 and 21-25 as allowable subject matter, and express their appreciation.

**Closure**

Applicant has made an earnest attempt to place the above referenced application in condition for allowance and action toward that end is respectfully requested. Should the examiner have any further observations or comments, he is invited to contact the undersigned for resolution.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Douglas E. McKinley, Jr.", written over the typed name and registration number.

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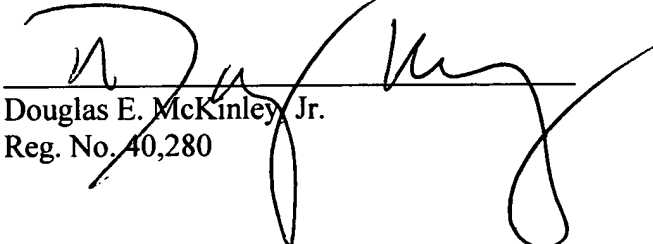
The undersigned hereby certifies that the forgoing Amendment dated February 14, 2004 in reply to the office action of October 14, 2004 (8 pages), PTO Form PTO/SB/22 (fee

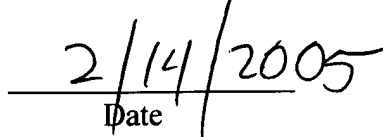
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Date